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S. Dee Jepsen
*The Ohio State University*, jepsen.4@osu.edu

Laura Akgerman
*The Ohio State University*, akgerman.4@osu.edu

Karen Funkenbusch
*University of Missouri*, FunkenbuschK@missouri.edu

Jessie Calero
*Mandy's Farm*, jessie@mandysfarm.org

Heather Kelejian
*North Carolina Cooperative Extension*, hlkeleji@ncsu.edu



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# Accessibility and Inclusion as an Approach to Enhancing Local Extension Programs

**S. Dee Jepsen**
**Laura Akgerman**
*The Ohio State University*

**Karen Funkenbusch**
*University of Missouri*

**Jessie Calero**
*Mandy's Farm*

**Heather Kelejian**
*North Carolina Cooperative Extension*

*Providing accessible learning opportunities and inclusive programs are critical to Extension's mission. Creating inclusive environments is more than consideration for individuals' personal identity. Using principles of Inclusion, Diversity, Equity, and Accessibility (IDEA) is an approach to intentionally build community and create new opportunities for education and growth. The Americans with Disabilities Act is a federal law requiring businesses and events to be accessible to individuals with disabilities. The Rehabilitation Act of 1973 states, "no qualified individual with a disability may be discriminated against in any program or activity receiving federal financial assistance." The legislation applies to Extension buildings, programs, and gardens that are available to the public. This article highlights Extension's relevance for creating accessible spaces and programs with examples from four U.S. states. Extension professionals within AgrAbility, occupational health, and therapeutic horticulture describe their experiences integrating IDEA to enhance urban agricultural programs. They share best management practices and additional resources applicable for community gardens, greenhouses, agritourism, and urban agricultural spaces. When Extension professionals and their collaborators strive to make urban programming accessible, they enhance the quality of life for participants. Applying disability service concepts to urban communities maximizes the Land Grant's mission to create inclusive environments, ultimately impacting agricultural sustainability.*

*Keywords:* agriculture, farming, gardening, disability, accessibility, inclusion, AgrAbility

Providing accessible learning opportunities and inclusive programming are critical components of the Extension mission. Accessibility does not benefit just one population but rather builds upon Extension efforts to embrace principles of Inclusion, Diversity, Equity, and Accessibility (IDEA). This approach has been embraced by urban growing spaces and community gardens across the country. It is especially important as renewed values are placed on opportunities to learn and grow through agriculture.

Truly embracing the term *inclusive* means more than exhibiting personal respect for individual participants and their identities. Inclusivity prioritizes practices that ensure accessibility, allowing all audiences to participate in community programming, employment, and recreation (Cummins et al., 2012). Accessibility and inclusion, or lack thereof, are highlighted when educational or community-centered activities and programs occur in non-traditional spaces, as is often the case in agriculturally-focused venues.

It is estimated that one in four Americans–that's 61 million people–have a disability that impacts their life activities (Okoro et al., 2018). While many Americans are born without a congenital disability, it is important to recognize that as people age, the likelihood that they will have a disability increases significantly. The Centers for Disease Control and Prevention (CDC) estimate 50% of all Americans aged 65 or older have a disability (CDC, 2016). One in four women are reported to have a disability, and it increases to two in five persons with a disability if they are non-Hispanic American Indians and Alaskan natives (Okoro et al., 2018). For persons with a disability, the CDC further calculates the following percentages: 13.7% have a mobility disability with serious difficulty walking or climbing stairs; 10.8% have a cognition disability with serious difficulty concentrating, remembering or making decisions; 5.9% are deaf or have serious difficulty hearing; and 4.6% have a vision disability with blindness or serious difficulty seeing even when wearing glasses (Okoro et al., 2018).

Percentages of adults with disability increase as poverty increases. Mobility disability is nearly five times as common among middle-aged adults living below the poverty level compared to those whose income was twice the poverty level (CDC, 2016).

Extension professionals are trained to teach through a variety of modalities, including in-person presentations or demonstrations; interactive discussions; virtual workshops and webinars; and working with large groups while providing side-by-side instruction and individualized support. Attention to accessibility is an important part of these educational opportunities. When Extension professionals offer audience-sensitive programming, they naturally increase inclusive programming opportunities to involve more clientele (Cummins et al., 2012; Mouton & Bruce, 2013; Taylor-Winney et al., 2019). Beyond the educational content, Extension educators provide a welcoming environment by creating, maintaining, and promoting accessible learning spaces. (Bravo, 2015; Peterson et al., 2012).

Extension educators who make programs accessible are not only creating successful programs, but they are also complying with state and federal law (McBreen, 1994). As outlined in the Americans with Disabilities Act (ADA, 1990/2008), people with disabilities are entitled to access all areas of public life. These public accommodation spaces include nonprofit organizations, community libraries, public parks, educational institutions, museums, and government buildings. Extension offices are included on this list.

The question can be asked, "How can Extension programs and activities be designed for accessibility by all?" Designing accessible programs takes into consideration a realm of conditions to meet a plethora of needs. Acknowledging these considerations takes into account physical accessibility needs (e.g., walking surfaces, restroom design, or access to adaptive tools), a space or program's sensory profile (e.g., noise levels, lighting, and exposure to weather), and communication methods (e.g., spoken or written language, visual signage, or audio communication). Persons with disabilities have the same expectations and interests as non-disabled community members. It is a matter of legal obligation for them to have access to public spaces whether they are by themselves, accompanied by a care provider, or spending time with friends and family. Knowing they can easily and safely access a space, event, or educational program is vital to their independence, quality of life, and ability to engage within their community.

The purpose of this article is to provide a basic understanding of accessibility and principles of universal design (Bravo, 2015) to support the Extension educator in addressing not only the needs of farmers and community members with disabilities but the broader needs of the entire community. The authors offer examples of tools, resources, and adaptive design to create an accessible learning environment. Programs in Missouri, New Mexico, Ohio, and North Carolina highlight Extension colleagues who have adapted physical settings, programming, and individualized support for persons with disabilities. These programs exemplify strategies for integrating accessibility into urban agriculture programming, including community gardens, farm markets, and agritourism venues.

## Background of U.S. Disability Laws

The Rehabilitation Act of 1973, as amended, prohibits discrimination on the basis of disability in programs conducted by federal agencies, in programs receiving federal financial assistance, in federal employment, and in the employment practices of federal contractors (Rehabilitation Act, 1973). The Americans with Disabilities Act is a civil rights law that prevents discrimination against individuals with disabilities in all areas of public life (ADA, 1990/2008). The purpose of the law is to ensure people with disabilities have the same rights and opportunities as everyone else. The ADA defines a person with a disability as a person who has a physical or mental impairment that substantially limits one or more major life activities, has a history or record of such an impairment, and is perceived by others as having such an impairment. The ADA also

makes it unlawful to discriminate against a person based on their association with a person with a disability.

Meeting compliance with federal disability laws has several approaches. It is important to have a basic understanding of common terms used when describing or referencing accessibility:

> **Accessibility** is when the needs of people with disabilities are specifically considered, and products, services, and facilities are built or modified so they can be used by people of all abilities (CDC, 2020).
>
> **Assistive technology** is equipment, software, and devices to increase or maintain function, productivity, and independence (Assistive Technology Industry Association, 2022).
>
> **Accommodation or modification** is an alteration to how a program is offered, so a person with a disability can attend and participate (ADA, 1990/2008; CDC, 2016).
>
> **Universal design** is an accommodation practice not to target persons with disabilities but rather to make areas accessible for all persons regardless of their disability status. The design and composition of an environment so it may be accessed, understood, and used to the greatest extent possible in the most independent and natural manner possible in the widest possible range of situations without the need for adaptation, modification, assistive devices, or specialized solutions by any persons of any age or size or having any particular physical, sensory, mental health, or intellectual ability or disability and in relation to electronic systems, and electronics-based process of creating products, services or systems so they may be used by any person (Bravo, 2015; National Disability Authority, n.d.).

Meeting compliance of accessibility from an Extension perspective takes into consideration several layers. Examples of items that need to be accessible include the promotional or marketing materials, the course materials and curriculum, program presentations and webinar content, signs, parking spaces, and buildings, especially with regards to restrooms and emergency exits. For agricultural programs, accessibility also means meeting access accommodations of physical spaces, such as public gardens, greenhouses, and other growing spaces of fruits, vegetables, and livestock.

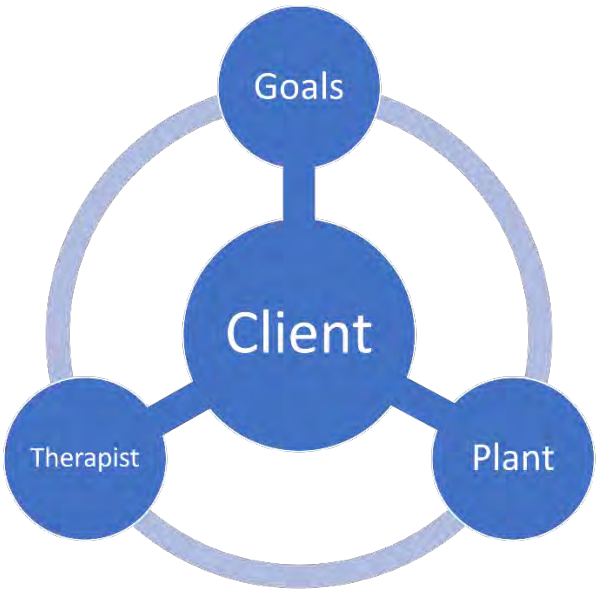
## Programs Serving Persons with Disabilities

A variety of programs are available for Extension professionals to address the many facets of accessibility, especially in an urban environment. Some programs provide direct consultation for persons with disabilities to match the environment with the person's ability. Others utilize the principles of universal design to create accessible spaces for both active and passive engagement.

## Horticultural Therapy

Horticultural therapy has very specific defined goals and is typically found in medical settings, including but not limited to hospitals, rehabilitation centers, mental health facilities, long-term care facilities, and group homes. Haller and Capra (2017) identify four elements necessary for intervention in horticultural therapy: a client, a trained horticultural therapy professional, defined goals, and plant material. All four elements must be present to consider an activity horticultural therapy (see Figure 1).

***Figure 1. Horticultural Therapy Practice: Elements and Process (adapted from Haller & Capra, 2017)***




The American Horticultural Therapy Association (AHTA), with a mission "to promote and advance the profession of horticultural therapy as a therapeutic intervention and rehabilitative modality," is the national leader for professional development of horticultural therapy and therapeutic horticulture (AHTA, 2022). Often these terms are used interchangeably, but they represent two different forms of therapy.

AHTA states the formal definition of horticultural therapy as "the participation in horticultural activities facilitated by a registered horticultural therapist to achieve specific goals within an established treatment, rehabilitation, or vocational plan" (AHTA, 2022).

## Therapeutic Horticulture

Therapeutic horticulture has broader overarching goals rather than specific, defined goals. Therapeutic programs may also be led by individuals who have some training in horticulture and allied human service fields but are not professionally registered. For example, several Master

Gardener organizations across the country provide opportunities for therapeutic gardening. These programs are conceived and led by Master Gardeners who have worked in fields such as special education, psychiatric nursing, and speech therapy. Therapeutic horticulture programs are found in more informal settings that can include senior centers, public gardens, and schools with a goal to improve the overall wellness of individuals, groups, or communities.

Both horticultural therapy and therapeutic horticulture focus on the process rather than the end product and have an important function in human health. Horticultural therapy requires active participation on the part of the client to reach the stated goals, while therapeutic horticulture includes forms of "active and passive involvement" (AHTA, 2022). Therapeutic horticulture programs can be offered to a broader audience, while horticultural therapy targets specific goals with a modality that is unique in the engagement of individuals with the natural world around them. Haller et al. (2019) do an excellent job outlining the many ways therapy programs of both types can be used in a variety of garden settings, including community gardens, urban gardens, therapy gardens, enclosed gardens, agricultural settings, developed landscapes, woodlands, and wilderness settings.

Most programs offered through Extension fall into the category of therapeutic horticulture. Not every state Extension program offers therapeutic programming, and currently, there is not a central location to find existing programs.

**AgrAbility**

Under the U.S. Department of Agriculture, National Institute of Food and Agriculture (USDA-NIFA), the AgrAbility Project has the vision to enhance quality of life for farmers, ranchers, and other agricultural workers with disabilities (National AgrAbility Project, n.d.). Funds are awarded to state teams comprised of a Land-Grant University and a nonprofit organization. AgrAbility programs are not available in all states. Current programs are listed on the AgrAbility website (https://www.AgrAbility.org).

Unique services are provided by this program to provide direct services to agricultural workers with personal consultations for workplace accommodations. AgrAbility staff can work in tandem or in isolation of state-specific vocational services to meet the needs of an accessible workplace environment, depending on the knowledge and capacity of case workers' knowledge for agricultural operations and equipment. The program also offers educational programs, resources, and networking opportunities to incorporate new technologies and disability services for persons involved in agriculture. Examples of these resources are provided in the resource section of this article. Working across regions in the United States, many state-funded programs have adapted their programs to meet the local disability needs for urban agriculturalists and veterans as well as for assistance-supported employment.

### Community Gardens

Unlike private gardens, community gardens involve the convergence of multiple individuals coming together to grow food, provide open space and greenery, and serve differing local needs within the geographic district it serves (Ferris et al., 2001). They can enhance sustainability and food security issues as well as increase health and mental well-being. Public gardens are used by and beneficial for individuals of any age, race, ethnicity, and socioeconomic status, as well as their disabled and non-disabled status. “What distinguishes a community garden from a private garden is the fact that it is in some sense a public garden in terms of ownership, access, and degree of democratic control” (p. 560).

Community gardens are found in a variety of settings with different purposes and management styles. Common types of community gardens include leisure gardens, school and children gardens, crime diversion gardens, healing and therapy gardens, entrepreneurial gardens, demonstration gardens, and neighborhood ecological restoration areas (Ferris et al., 2001).

## Experiential Learning Model

The foundation of experiential learning is the application of hands-on learning, with active reflection and translation of what the learners are doing. It is not simply learning a skill through repetitive practice. Best used in adult education, experiential learning allows for hands-on skills and critical thinking skills to be improved and put into action (Peterson, 2019).

Kolb (1984) describes experiential learning as a four-part cycle as it engages with the learners:

1) The learner has concrete experience with the content being taught.
2) The learner reflects on the experience by comparing it to prior experiences.
3) Based on experience and reflection, the learner conceptualizes new ideas about the content being taught.
4) The learner acts on their new ideas by experimenting in an experiential setting.

Combining the experiential learning model of “do, reflect, apply” for persons with disabilities allows participants to be actively engaged in urban agricultural programs when such programs include adaptive practices or accessible experiences. Participants increase their knowledge, learn new ways to apply that knowledge, develop their skills, gain confidence and clarify their values while entering, establishing, building, and managing successful urban farm enterprises or accessible garden plots.

## Highlights of Four U.S. Programs

Within communities, urban agricultural programs have appeared in various formats. It is not uncommon to see gardens on the properties of hospitals, schools, and rehabilitation centers. Also popular with job service agencies, agriculture is a welcomed skill, lifestyle, and stress reliever.

The authors, who all have an Extension appointment and serve persons with disabilities, share highlights of their state's urban agricultural outreach programs focusing on how they offer disability services and adaptive features for physical spaces. While several authors are associated with an AgrAbility program, being a part of an AgrAbility program is not a requirement for meeting the accessibility needs of clientele when working in Extension-related positions.

**Missouri**

The University of Missouri Extension (MU Extension) initiated an AgrAbility program 25 years ago with a focus on disability and adaptive agriculture to promote productivity and independent living for agriculturalists with disabilities and their families. Rural and urban agriculture, commercial small plot accessible gardening, horticulture therapy, or even therapeutic gardening are not new concepts in Missouri. MU Extension is committed to ensuring equitable opportunities and services through greater access, full participation, and economic self-sufficiency. Outreach efforts are intentional in designing accessible physical environments and providing education-based programs that are inclusive to all individuals with disabilities from diverse backgrounds and ability levels.

The Missouri AgrAbility program uses educational workshops and informational-based resources to assist individuals with disabilities, including veterans and their families, in urban (Columbia, Joplin, Kansas City, Springfield, St. Louis) and non-urban areas who engage in agricultural operations as a means to enhance their income. Adaptive urban agriculture has ranged in scale and intensity, from square foot accessible community gardens to church-operated commercial urban farms.

Occupational therapy and vocational rehabilitation are two examples of Missouri's health and human service fields that are closely connected to horticultural therapy by similar techniques, treatment strategies, shared facilities, program settings, and clients served. Allied health and vocational rehabilitation professionals collaborated with MU Extension 4-H, agricultural business, agronomy, horticulture, and livestock Extension specialists to develop and deliver experiential, accessible gardens and adaptive, hands-on programs.

Educational workshops are presented by trained facilitators. Online and face-to-face programs provide participants with an experiential, hands-on approach to urban agriculture with accessible small plot gardening techniques. Concepts about basic principles of ergonomic and energy conservation involved in community gardening and adaptive agriculture are taught. Primary considerations of the gardening process are based on the grip, reach, and body positioning, as well as exposure to accessibility issues in planning the garden, such as pathways and watering systems, are presented. Participants also learn how to apply assistive technology techniques, adapt equipment, and modify tools. Emphasis is placed on ways to access the garden, especially for persons who use wheelchairs, those with low vision, and those with mobility limitations.

Informational-based resources include techniques about how to adapt your garden as well as adaptive agriculture tip sheets, booklets, and toolkits that suggest safe strategies to help farmers with disabilities identify specialized resources from the literature, Internet, and commercial arena. AgrAbility concepts are also presented and include the provision of service, potential for financial assistance, injury prevention, and promotion of health for agriculturalists with disabilities.

### *Veteran Urban Farm*

Another Missouri initiative is the Veteran Urban Farm, whose goal is to improve basic food and agricultural literacy, especially for people who lack connections to or experiences with agriculture. The Veteran Urban Farm is a working farm located in Columbia, Missouri. It is a place for veterans with diseases, disabilities, and disorders and their dependents to build community and heal in a healthy, therapeutic environment. Veterans with disabilities and their families use their produce to feed at-risk community members using their home-grown products.

## New Mexico

In New Mexico, farmers and growers of all ages and backgrounds can access support through the New Mexico AgrAbility Project (NMAP), a collaborative effort between New Mexico State University's Cooperative Extension Service, Mandy's Farm, the University of New Mexico's Occupational Therapy Program, and the New Mexico Technology Assistance Program (NMTAP). Through NMAP, farmers born with or have developed a new disability can access technical assistance, adaptive technology and tools, occupational therapy support and evaluations, and farmer education focused on reducing risk of injury, increasing accessibility in day-to-day work environments, and increasing agricultural productivity for disabled farmers. While services through NMAP are offered statewide, the majority of NMAP service recipients are disabled residents of Central New Mexico, specifically Albuquerque and the surrounding areas. Albuquerque is divided by the Rio Grande, along which a sprawling urban community has developed, referred to as the Albuquerque Metro Area. Traversing four New Mexico counties: Bernalillo, Sandoval, Torrance, and Valencia, this urban center boasts between 750,000 and 1,000,000 residents. Individuals and families practice urban farming throughout many of these communities, both within typical subdivided communities in more crowded regions and properties comprising several acres or more in the South or North Valleys and East Mountains.

### *Mandy's Farm Apprenticeship Programming*

Through Mandy's Farm, a nonprofit organization focused on opportunities for individuals with disabilities, prospective farmers with disabilities who are interested in launching their own urban farming operation or who would like to pursue employment within an existing farming operation, can participate in the AgrAbility Apprenticeship Program. Housed across two sites, comprising over seven acres of urban farmland in the Rio Grande Valley, the AgrAbility

Apprenticeship Program provides intensive hands-on, virtual, and classroom-based teaching for prospective farmers with disabilities. Apprentices complete a year-long learning phase designed to prepare them to work on an existing farm or start a micro-farming business of their own. They obtain invaluable experience in fruit and vegetable cultivation, farm operations and infrastructure, water conservation, soil amendment, animal husbandry, and worksite safety. Farming infrastructure, curriculum, and program design are uniquely focused on being accessible to people with a wide range of literacy levels, disabilities, communication styles, sensory needs, body sizes, and mobility needs. After completing their apprenticeship, disabled farmers can choose to incubate their small business at Mandy's Farm, with full access to water, farmland, infrastructure, adaptive tools, technical assistance, and other resources.

**Accessibility and Inclusion.** While a variety of programs focused on cultivating small-scale farming exist, Mandy's Farm is unique in its focus on integrating disabled farmers into the agricultural ecosystem, especially those who are considered to have more intensive support needs. Intensive support needs include individuals with disabilities who need extensive physical assistance, benefit from augmentative communication, require enhanced assistance related to personal and medical care, or require significant prompting and other cues when completing daily tasks. Many farming spaces embrace a whole-systems approach in relation to the ecology, infrastructure, and human activity within growing spaces while neglecting to consider accessibility and principles of universal design. To create a healthier and more inclusive community, Mandy's Farm embraces permaculture practices and universal design principles focused on careful observation and planning, cultivating growing spaces that embrace different levels of mobility, continuous quality improvement, leveraging adaptive tools and equipment, using and valuing renewable resources, eliminating waste, embracing existing ecosystems and biodiversity, working slowly and strategically, and embracing challenges as an opportunity for change and creative problem-solving.

These attitudes and philosophies are supplemented by an adaptive curriculum focused on providing farmers with a variety of concrete techniques and tools they can implement within their own gardens and small-farming businesses like a wide range of raised bed heights and vertical gardening styles, an array of adaptive tools, and leveraging access to automation and assistive technology. The program curriculum embraces a strengths-based philosophy in addressing the needs of the land, as well as the needs of disabled farmers. The program focuses on each farmer's unique skills and assets and leverages those to create success.

In preparing team members for their roles in delivering accessible and inclusive programming, Mandy's Farm prioritizes training focused on disability inclusion and accessibility, as well as anti-ableism practices and opportunities for advocacy. Training is provided internally to employees, volunteers, board members and externally to community businesses and nonprofit organizations. Training is led by a Mandy's Farm team member who identifies as disabled and is

focused on developing strategies to mitigate societal and physical barriers, both on-site at Mandy's Farm and in the community.

Given the uniquely diverse setting that Mandy's Farm operates in, programming within Mandy's Farm is also focused on the intersectionality between disability and race. While only 12.8% of working-age people (21-64 years old) in New Mexico have a disability, according to the American Community Survey, the rate of disability in New Mexico is much higher in communities of color (Cornell University, 2018). Of White New Mexicans, 12.5% identify as disabled, compared to 13.9% of Latinx residents and 16% of Native Americans. Mandy's Farm acknowledges that while disability status is not influenced by an individual's race, ethnicity, gender identity, sexual orientation, religion, social status, age, or income, access to healthcare and diagnosis, early intervention, and long-term support are deeply influenced by these factors. Mandy's Farm has worked to embrace inclusivity and dismantle discriminatory practices by centering the lived experiences of disabled individuals who identify as members of other marginalized groups rather than those of caregivers, healthcare providers, or clinicians. Furthermore, Mandy's Farm has examined and is working to address how implicit bias and discriminatory processes are embedded in organization planning, program design, physical space, printed materials, policies and procedures, training programs, advocacy initiatives, and calls-to-action.

**Engaging the Broader Community.** Mandy's Farm has leveraged community interest in farming to expand knowledge around agriculture, accessibility, and universal design. Through education and outreach provided to employee teams on corporate retreats, students of all ages on school field trips, service learning projects, and other community groups, Mandy's Farm has introduced a wide cross-section of the community to the unique environment of the urban farm. Members of the public have accessed education in agriculture, utilizing adaptive tools, visual signage, indoor and outdoor classroom design considerations, allowing Mandy's Farm team to share inclusive practices and accessibility measures with the broader community.

## Ohio

Ohio State University Extension (OSU Extension) has programs and Extension teams in AgrAbility, urban agriculture, horticulture, and Master Gardening. The role of Ohio AgrAbility (OAP) is highlighted in this article. OAP is a partnership between OSU Extension and EasterSeals Serving Greater Cincinnati. While the primary client base is farmers, networks are extended to additional rural and urban agriculturists through workshops, presentations, and outreach resources. Through multidisciplinary programming, OAP's outreach has expanded into on-site consultation services and occupational therapy-related resources for a wider audience. Popular educational programs, and their link to accessibility and inclusion, are described.

### *Popular Educational Programs*

Many of OAP's urban agricultural programs focus on accessibility and inclusion for all persons. Programs include *Gardening with Arthritis*, *Ergonomic Gardening*, *Gardening Across the Lifespan*, and *Gardening–It Doesn't Have to Hurt!* The presentations emphasize the garden infrastructure, tasks, tools, equipment, and garden beds to suit the gardener's ability. The size and location of the garden are secondary to making it accessible.

Gardening workshops are offered throughout the year. Workshops in winter and fall add considerations for garden maintenance and physical structures that suit a gardener's ability. Spring and summer workshops focus on being mindful of energy, fatigue, sun and heat exposure, and possible medication interactions.

Good work habits like safe lifting and techniques for reducing neck and back strain are demonstrated in the workshops. Examples of ergonomic tools designed to encourage good body mechanics are passed around, and handouts listing suggestions for tools and equipment are shared with workshop attendees and posted on the OAP website. Suggestions are offered for simple ways to modify tools the gardener already owns and low-cost ideas for growing container gardens.

The workshops also address memory or cognitive issues and ways to keep gardeners engaged and active in the garden as their abilities decline. This topic was inspired by questions from Master Gardeners who wanted to know how they could keep fellow gardeners involved as their strength, memory, or cognitive abilities diminish.

### *Gardening Job Aids*

Ohio AgrAbility staff worked with Extension horticulturalists to create a collection of job aids for employers, supervisors, and job coaches who have workers or volunteers at their worksites with intellectual disabilities. The curriculum utilizes photos and videos to demonstrate a specific gardening task, with an emphasis on appropriate tools, safety, and modifications to suit different physical limitations.

### *GardenAbility*

Ohio AgrAbility collaborated with OSU Extension State Master Gardener coordinators and OSU occupational therapists to develop *GardenAbility*, a continuing education program for Master Gardener Volunteers. The focus of this 3-day train-the-trainer program is to provide Master Gardeners the tools and information to teach ergonomic concepts, including gardening with arthritis and other limiting techniques and workplace modifications in their local programs.

### *Universal Design Workshop and Garage*

Ohio AgrAbility has an on-site demonstration area at The Ohio State University's Molly Caren Agricultural Center. The Universal Design (UD) Garage is part of a Universal Design house that annually attracts 1,400 farmers and farm families attending Farm Science Review, a large farm show in Ohio. This space is used as a learning lab in the off-season, where accessibility workshops demonstrate tools, equipment, and concepts for making the garage and farm shop a comfortable workspace for persons of all abilities.

## North Carolina

North Carolina Cooperative Extension (NCCE) offers programs in all 100 counties and to the Eastern Band of Cherokee, for a total of 101 Extension-based offices. According to the North Carolina Department of Health and Human Services Office of Rural Health (2019), 30 counties are considered urban. NCCE designs and implements AgrAbility, agriculture, urban agriculture, horticulture, therapeutic horticulture, food, 4-H youth development, and Master Gardening programs. In this article, programs that embrace therapeutic horticulture will be highlighted.

### *Therapeutic Horticulture*

In North Carolina, there are two Extension-based therapeutic gardening programs in public gardens. Bullington Gardens has a mission "to connect children and adults with the natural world through science-based horticultural education, to demonstrate the beauty and value of native and ornamental plants through themed public gardens, and to enhance life skills for children and adults with physical or mental challenges through horticultural therapy." The New Hanover County Arboretum's Ability Garden program strives to "empower the underserved through gardening, education, inclusion, and community engagement." In addition to these garden-based programs, 20 counties in North Carolina offer some type of therapeutic horticulture programming through Master Gardener projects. These three programs incorporate all four aspects of IDEA as they continually work to develop accessible physical garden spaces to work in and create adaptive and inclusive programming.

**Therapeutic Horticulture in Public Gardens.** The Ability Garden and Bullington Garden target four aspects of wellness–social, physical, emotional, and mental. Each program employs the principles of universal design to create dynamic, interactive education spaces, welcoming all members of their communities regardless of age, sex, sexual orientation, gender identity, race, religion, or physical limitations. Each garden has a fully accessible greenhouse space, so therapeutic programs are possible throughout the year. These two programs also have accessible outdoor workspaces and gardens with beds that accommodate work from wheelchair height. Accessible pathways, seating, hoses and watering systems, and access to shade are other important components of design in each garden. Outreach is another important aspect of these

programs, reaching underserved populations unable to visit the gardens, which promotes equity in the services offered to the communities they serve.

The Ability and Bullington Gardens work with participants of all ages, focusing on therapeutic goals that include using accessible tools, garden design, propagation, prevocational skills, life skills, rehabilitation skills, budgeting, teamwork, leadership, self-confidence, increased memory, and socialization. Both programs offer training opportunities in therapeutic horticulture, have membership in the Carolinas Horticultural Therapy Network to promote and educate the use of therapeutic horticulture, and are supported through Master Gardener Volunteers.

**Therapeutic Horticulture Through the North Carolina Extension Master Gardener Volunteer Program.** North Carolina Extension Master Gardener Volunteers (EMGV) support therapeutic gardening in 20 of the 100 counties in the state. The most developed of these programs is the Wake County Therapeutic Horticulture Committee which was created to "support social development, psychological well-being and physical rehabilitation for those who are physically and mentally challenged" (Bradley, 2020). The founding group wanted to make gardening more accessible to disabled members of their community. In 2019, the group served 12 sites in the county, which included assisted living facilities, a community rehabilitation program, residential addiction recovery programs, and a day program for women experiencing homelessness. The programs occur at the facilities being served and, when possible, create garden spaces that follow universal design principles. Scheduling is based on the needs of the facility and the capacity of the volunteers. Each site is assigned a team of EMGVs with co-leads. The team works with the facility to set the schedule and develop activities appropriate to the participants' abilities. The EMGVs who join the committee are encouraged to take advantage of educational opportunities through NC Cooperative Extension and NC State University, including two online courses—Introduction to Therapeutic Horticulture and Therapeutic Horticulture Program Development—created in partnership with the North Carolina Botanical Garden.

Therapeutic horticulture in North Carolina is growing through the state's Extension service. A clear model is beginning to develop that includes the creation of accessible spaces in public gardens and outreach sites with gardens, advanced training for Master Gardener Volunteers on adaptive accommodations for gardening, working with special populations and the healing benefits of nature, and collaboration with community-based organizations to promote inclusiveness and equity in our services. In the future, therapeutic horticulture can be used to engage all persons in gardening and create truly inclusive spaces that focus on people-plant connections to support overall wellness.

## Discussion

Extension welcomes all people to discover programs, access resources, and build new skills. In addition to sharing the knowledge of the university with the citizens of the state, Extension also has an obligation to welcome all people of all abilities, to participate, learn, and engage. The

obligation comes from Extension's mission and federal laws such as the Rehabilitation Act of 1973 and the Americans with Disabilities Act.

Extension professionals can work within their communities to improve the health of people living with disabilities. "Inclusion is improved, and health disparities are reduced when people with disabilities are no longer viewed solely as recipients of need, but rather, by their assets and ability to design solutions that benefit their own health (Gherman, 2018).

Persons with disabilities have the same expectations and interests as non-disabled community members. It is important for them to access public spaces when they are by themselves, accompanied by a care provider, or spending time with friends and families. Knowing they can easily and safely access a space, event, or educational program is vital to their independence and ability to engage within their community. Examining the facilities used to offer Extension programming for accessibility requirements is an intentional action that requires forethought on behalf of the program coordinators.

Lessons learned from the examples stated in this article highlight several key concepts and best management practices for accommodating persons with disabilities. Urban agricultural teams can utilize these practices to create a more inclusive environment as they create accessible spaces in their communities.

## Best Management Practices for Creating Accessible Spaces

The best way to create accessible spaces is to be proactive when planning, building, or renovating. A public space can become a welcoming and accessible location by using accessibility principles and universal design standards. Common practices for modifying physical spaces include the following recommendations.

### *Walkways and Accessible Routes*

- Walkways must have a minimum clear width of 36" for wheelchairs and scooters used by individuals with disabilities. Wider walkways allow people with mobility devices to travel next to pedestrians and turn around easily.
- The minimum space needed for a turnaround is 60" x 60" (to make a "T" or 3-point turn)
    - If a walkway, aisle, and row dead-ends and requires people to turn around and travel back on the path to exit, there should be room for a wheelchair also to turn around.
- Walkways must have firm, smooth surfaces to minimize the risk of trips, slips, or falls. Avoid loose materials like sand, gravel, and mulch.

    - However, a smooth surface of firmly packed crusher-run 75 3/8-inch and under gravel (includes particles 3/8-inch diameter down to fines) can accommodate wheelchairs and scooters.
- Walkways must have adequate drainage and be free of puddles and mud.
- Remove or barricade all overhangs, obstructions, sharp objects, or other hazards that could cause injury if customers bumped against them.
- Objects placed on or next to a walkway should be detectable by a person using a cane.

***Public Gardens or Spaces***

- Make the access and use of the space the same for everyone.
- If there are buildings, arbors, or other shade structures in the space, be sure they are accessible to all persons. Besides having benches beneath the shaded areas, make sure there is room for a few wheelchairs or other mobility devices to park between/beside the benches (under the shade).
- Consider providing grab bars and other unobtrusive tools for moving from sitting to standing as well as providing physical cues to those with low or no vision.
- Don't fill all the empty spaces with trash cans or other objects. Leave space for wheelchairs and mobility scooters.
- Walkways should be 3-4 feet wide with no barriers (trash cans, planters, hanging baskets). Wider walkways allow people with mobility devices to turn around easily and travel next to a pedestrian.

## Conclusion

The urban settings of our communities are fertile ground for programs that use gardens and nature-based activities to improve personal and community well-being. Extension professionals can enhance inclusiveness by uniquely tailoring their programs to address the needs of individuals living with disabilities to participate in urban agricultural activities.

Extension professionals are encouraged to build relationships with disabled participants, professionals, and farmers. These voices on advisory committees and as volunteer staff will strengthen their program team. Community members who offer their lived experiences often have far greater expertise, creative problem-solving skills, and ideas for more inclusive programming.

Additionally, modifications to physical spaces can enhance access to local programs, gardens, and growing spaces. Applying best management practices to these locations increases accommodation capacity even without the presence of an Extension educator.

In urban settings, horticulture programs can be a focal point for activities that engage the community. Within the context of accessible agriculture, there are opportunities to grow the IDEA approach for better inclusion, diversity, equity, and accessibility. Enhancing accessibility to agricultural experiences is a critical step that can lead to overall wellness and increased quality of life for the participants. Creating and prioritizing accessible programs for the Extension professional allows their programming to stand out and be more inclusive for all clientele.

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*Dee Jepsen* is a Professor at The Ohio State University. She is the Program Director for Ohio's AgrAbility Program and gives leadership to the OSU Extension Agricultural Safety and Health Program. She has dedicated 30 years to occupational safety and health issues serving the agricultural community. Please direct correspondence to S. Dee Jepsen at jepsen.4@osu.edu.

*Laura Akgerman* is the Disability Services Coordinator for Ohio AgrAbility & Ohio State University Extension. She presents workshops on gardening with arthritis, farming with a disability, AgriTourism, and other disability-related issues for Ohio AgrAbility and OSU Extension.

*Karen Funkenbusch* is the State Health and Safety Specialist and Director/PI of the Missouri AgrAbility Project at the University of Missouri. For 25 years, Funkenbusch has presented commercial small plot accessible gardening, adapted gardening, or urban agriculture education programs and facilitated assistive technologies and hands-on tool talks for individuals with disabilities, including veterans and their dependents.

*Jessie Calero* is the Development Director of Mandy's farm, a disability organization based on a farm in the South Valley of Albuquerque. She is a life-long resident of New Mexico who earned her Bachelor's and Master of Arts degrees from the University of New Mexico and has more than 10 years of experience in nonprofit leadership and fundraising.

*Heather L. Kelejian* is the Extension Therapeutic Horticultural agent with North Carolina Cooperative Extension. She also serves as Director of the Ability Garden at the New Hanover County Arboretum. She is a North Carolina native who has practiced therapeutic horticulture in a public garden setting since 2004. The work has been rewarding, combining her love of plants and nature with her desire to help others.

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